Cultural Diversity and the Darwin-Wallace Pattern: Cultural Variation and Cultural Diversity as Major Transitions of Evolution

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Abstract: The emergence of culture and language is viewed as a “major transition” in the evolution of species. I seek to investigate how culture builds upon the Darwin-Wallace pattern of constant or near constant slight variations across individual organisms in species. The emergence of culture and language in the evolution of the human species increases the number and diversity of characteristics across individual organisms in the human species. I discuss how this is partly comparable to the Darwin-Wallace pattern of constant or near constant variations across individual organisms in species, and I also discuss how culture and cultural patterns differ from the Darwin-Wallace pattern: 1) cultural variation and cultural diversity sometimes involve slight differences across individuals and groups, and this is partly comparable to the Darwin-Wallace pattern of constant or near constant slight variations across individual organisms; however, 2) cultural variation and cultural diversity also may involve large cultural differences and even chasms of cultural differences across linguistic groups, ethnic groups, and societal groups; 3) culture also may reduce cultural differences and cultural chasms across groups, as in the diffusion and spread of gods, goddesses, and God, music, the arts, science, philosophy, technology, spoken and written languages that replace earlier languages or that are translated between existing languages; 4) innovation and creativity that involve large differences or “macromutations” in cultural and technological productivity and “progress.” Since Darwin stated that the Darwin-Wallace pattern implied gradualism, and that the theory of natural selection implied gradualism (“natura non facit saltum”), I also discuss the contrast between the gradual nature of evolution implied by Darwin’s theory, and the potentially exponential nature of material culture or technological growth.

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Introduction: The “major transitions” in the evolution of biological species include the emergence of greater complexity in the transitions from the simplest life forms, prokaryotes and eukaryotes, to the evolution and differentiation of complex, multicellular life across species, to the emergence of language and culture (including technology) in the human species. (1-7) The emergence of culture and language are viewed as “major transitions” in the evolution of biological species (4-9); in this paper I seek to investigate how culture builds upon the Darwin-Wallace pattern of constant or near constant slight variations across individual organisms in species. Since the emergence of culture and language increases the number and diversity of characteristics across individual organisms in the human species, there is a partial analogy between the Darwin-Wallace pattern and the emergence of culture. That is, the Darwin-Wallace pattern describes the phenomenon discovered by Charles Darwin and Alfred Russel Wallace: there is a pattern (or set of patterns) of constant or near constant ‘perpetuating’ variations across individual organisms in species to species to species. (10-11) As Darwin and Wallace also sought to demonstrate, the human species is a species that manifests the Darwin-Wallace pattern in that there are constant or near constant slight variations across individual organisms in their biological and physiological characteristics; however, with the emergence of language and culture, there is another source of variation across individual organisms, i.e., the emergence of culture and language. Culture and language increase the number and diversity of characteristics across individual organisms in the human species, and increase the number and diversity of characteristics across groups, as in across different linguistic groups, ethnic groups, and racial groups.

The analogy between cultural variation and the Darwin-Wallace pattern, however, is partial: cultural variation and cultural diversity across human individuals may involve constant slight variations across human individuals, such as “likes,” “dislikes,” tastes, and affinities for different cultural patterns (metaphor: variation in “flavors” within a paradigm or pattern, and attraction or interest in a flavor or set of flavors in contrast to other, related flavors within the paradigm or pattern); innovation and creativity may involve more than slight variations in culture across individual organisms, and linguistic and cultural variation across ethnic groups, linguistic groups, societies, and racial groups, may involve large differences or even chasms of cultural differences across the different ethnic, linguistic, societal, or racial groups.

Innovation and Creativity in Culture: It is many times commented that Darwinist theory does not allow ‘large mutations’ or so-called ‘macromutations’ across human individuals or individual organisms of other species, since the large mutations across individual organisms are not assimilable by the genetics of breeding populations; however, small or slight heritable variations across human individuals that result in a diversity of behavioral characteristics or branching patterns of behavioral characteristics across human individuals, when expressed in cultural patterns, like written languages (Latin, English, or other languages) or Arabic numerals, may result in spectacular expressions of “progress” in behavioral characteristics and cultural achievements in science, philosophy, religion, technology, music, and the arts. (12-17) Prominent examples include the scientific revolutions of Ptolemy, Copernicus, Galileo, or Newton, or the technological revolutions of Watt, Marconi, Edison, Ford, Bill Gates, or Steve Jobs, or the religious “revolutions” that established the major world religions, of Confucius, Buddha, Christ, Muhammed, or Moses. Important cultural achievements, or cultural “progress,” or “revolutions,” sometimes are not generational: Alfred Louis Kroeber comments that the Chinese language existed for thousands of years before Chinese scholars recognized, when in contact with and translating Buddhist texts from Sanskrit, that the Chinese language had tones; John Dewey comments that concepts of biological inheritance remained largely derivative of Aristotle’s concept of ‘pangenesis,’ including the work of Darwin and Wallace, until Mendel’s conception of particulate units of genetic inheritance; early physics retained Aristotle’s theory of gravity until Galileo showed Aristotle’s conception to be illogical and theory to be empirically wrong; Wittgenstein, Noam Chomsky, and Jorge Luis Borges suggest that ideas about the nature of language remained largely unchanged since the work of St. Augustine.

Cultural variation across ethnic, linguistic, racial and societal groups: Cultural variation across ethnic, linguistic, racial, and societal groups usually involves large cultural differences, and even cultural chasms, instead of slight differences; early warfare between human social groups usually involved war across groups that were separated by cultural chasms, such as warfare across different languages, gods, and religions; however, some cultural patterns may reduce large differences and cultural chasms across linguistic, ethnic, racial, and societal groups. Culture and cultural patterns have the capacity to diffuse and spread across human social groups: gods, goddesses, and God may spread and diffuse across human social groups, and also languages, music, art, technology, science, and other cultural patterns.

Culture and the Darwin-Wallace Pattern: It is sometimes asked whether culture is Darwinistic or not, and many observers have recognized that culture has both Darwinistic and non-Darwinistic aspects. Cultural and technical inventions that increase societal productivity or a society's capacity for warfare or the deterrence and avoidance of war, may be conserved and retained in a way that is partly analogous to the Darwinistic process of selecting and conserving adaptive properties in the evolution of biological species. Warfare between different societies or linguistic or ethnic groups, that may result in the extermination of one society or group or another, is also partly analogous to Darwinism, although the units of selection are groups or societies instead of individuals. Thus, culture may increase the capacity for warfare across groups by increasing differences between human social groups, such as linguistic differences or religious differences; alternatively, culture may reduce the capacity for warfare, and especially exterminatory or genocidal warfare, by reducing cultural differences and cultural chasms across groups, as in the diffusion and spread of gods, goddesses, and God, or other cultural patterns, such as music.

Thus, since cultural variation across individuals increases the number of characteristics across individuals (compared to absolute physiological differences across individuals), cultural variation and cultural diversity across individuals may increase the capacity for selection across a larger number of characteristics: that is, cultural variation and cultural diversity may increase the capacity for Darwinism, and the capacity for selection across a larger diversity of characteristics, by increasing or magnifying the Darwin-Wallace pattern that applies across biological and physiological characteristics of individual organisms.

Culture also increases the capacity for Darwinism when cultural patterns, such as separate written and spoken languages, religion, music, or other cultural patterns, generate chasms of cultural solidarity between groups, and may result in warfare or exterminatory warfare between the groups. (This form of Darwinism between social groups was likely common in early human evolution, and continued into the 19th and 20th century in countries such as the United States, Latin American societies, Australia, and New Zealand, with the extermination and isolation of native American societies, and the extermination of Jewish populations in Europe in the 20th century).

Thus, in the co-evolution of culture and human biology, some cultural patterns may reduce genetic contact and the genetic diversity of populations: This may happen when cultural contact and diffusion, and population contact and diffusion, are limited or reduced by cultural chasms or barriers, such as different and separate gods, goddesses, God, and religion, different or separate musical and aesthetic traditions, different or separate philosophical, moral, and scientific traditions, or different written and spoken languages with limited or no translation between them; alternatively, the spread and diffusion of gods, goddesses, God, and religion, and other cultural patterns, such as music, philosophy, science, may break down and reduce cultural barriers and chasms across pre-existing social groups, and thus increase genetic contact between groups and genetic diversity.

The Nature of Darwinism and the Nature of Culture: Charles Darwin sought to establish that the evolution of biological species is gradual ("natura non facit saltum"): Darwin proposed that the constant or near constant slight variations across individual organisms are inheritable, that natural selection conserves and retains the more favorable variations and eliminates the less favorable variations generation per generation, and that since slight variations across individual organisms are conserved and retained each generation, biological evolution is "intensely gradual"; however, William Ogburn was the first scientist to claim that cultural growth is exponential over the generations of human evolution: that early simple societies for most of human evolution, from archaic *Homo Sapiens* approximately 500,000 years ago to 10,000 years ago had relatively small amounts of culture and technology, and slow rates of cultural accretion, until the neolithic revolution of established settlements and the emergence of writing systems 10,000 years ago; since the neolithic revolution, post-neolithic societies have had much faster rates of cultural and technological growth compared to pre-neolithic societies (and post-neolithic societies have largely exterminated pre-neolithic societies), as the base of culture, including a larger base of combinations of existing technologies and inventions, have increased. Societies that have participated in the industrial revolution, have had much faster rates of technological and cultural growth than pre-industrial societies; thus, Ogburn suggested that material cultural growth or technological growth have been exponential from the earliest simple societies to contemporary post-industrial societies; thus, while Darwin sought to establish the gradual nature of the evolution of biological species, Ogburn showed that material cultural growth or technological growth is exponential or nearly exponential in the evolution of human societies from archaic *Homo Sapiens* to most contemporary societies around the world; from a more microscopic or "fine-grained" perspective, the development and success of different patterns in symbolic culture may facilitate or play a role in technological invention and growth ("hardware"), and the diffusion and spread of material culture or technology. In what languages, mathematical systems, or symbolic systems ("software") do individuals or groups contribute potential scientific and technological revolutions? For Copernicus, Galileo, and Newton, exposure or fluency in Latin, Greek, Euclidean geometry, and Arabic numerals may have been cultural prerequisites for their scientific revolutions, and they may have been cultural prerequisites for technological advances and revolutions by their contemporaries (as the graphical user interface and contemporary computer software may be prerequisites that facilitate contemporary scientific and technological advances; in the medieval period, Europe and the West were technologically behind the Arab and Muslim worlds, and also China, before Fibonacci's revolution in cultural diffusion simplifying and spreading Arabic numerals and the decimal system to Europe and the West). From Ogburn's perspective, the greater political diversity and linguistic diversity of Europe may have facilitated greater cultural diffusion of ideas and technologies compared to the early modern Muslim world or China, once Europe had reached a level of development that it could compete with the Muslim world and China. From the standpoint of human evolution, the invention of new technologies that may have exponential rates of growth, like increasing computing power described by "Moore's Law," are special cases of Ogburn's Principle. (18-20) There are debates in the literature as to whether some sets of technologies, and also societies themselves, may plateau in technological development and growth. However, brief technological plateaus may be overtaken by unexpected inventions and combinations of technologies over the longer term. From the standpoint of human biological evolution, cultural growth is potentially exponential or nearly exponential over the generations of human evolution, although in particular centuries or millennia there may be fits and starts, plateaus, and also acceleration and stupendous leaps and jumps; however, as Charles Darwin sought to establish, human biological evolution is gradual.

It is agreed by important evolutionary biologists, such as Maynard Smith, Szathmary, Gould, Wilson, and others, that the emergence of culture and language is a "major evolutionary transition." Since the evolution of biological species is by nature gradual, and the evolution of cultural growth in the human species is potentially exponential over the generations of the human species, there is the question of the intersection and interaction of culture and cultural growth with human biology and human biological evolution. Although Darwinism implies gradualism, Edward O. Wilson comments that the evolution of species in the Genus *Homo* is faster than the evolution of primate species or other animal species, and that the evolution of the human species is faster than the evolution of primordial species in the Genus Homo: "The cerebrum of *Homo* was expanded enormously during a relatively short span of evolutionary time . . . Three million years ago *Australopithecus* had an adult cranial capacity of 400-500 cubic centimeters, comparable to that of the chimpanzee and gorilla. Two million years later its presumptive descendant *Homo erectus* had a capacity of about 1000 cubic centimeters. The next million years saw an increase to 1400-1700 cubic centimeters in Neanderthal man and 900-2000 cubic centimeters in modern *Homo sapiens*. The growth in intelligence that accompanied this enlargement was so great that it cannot yet be measured in any meaningful way . . . no scale has been invented that can objectively compare man with chimpanzees and other living primates." (21)

In the evolution of the Genus *Homo* and the evolution of the human species itself, the branching pattern of characteristics across individual organisms has increased tremendously compared to primates: that is, the number of faces and facial characteristics (eye, nose, chin and cheek positioning, chin and cheek dimpling, eye colors, hair colors, and hair textures), body types and physical characteristics, and behavioral characteristics, including intelligences, talents, personality characteristics, expressions, and emotions, have been increasing in the evolution in the Genus Homo, and most spectacularly in the evolution of the human species, compared to primates. This raises the question of the intersection and interaction of Darwinism with culture and cultural growth: The intersection and interaction of culture and cultural growth, that has the potential for "jumps," "leaps," and "macromutations," and may even manifest exponential growth, with Darwinist biological evolution that is gradual, has resulted in an acceleration of evolution in the Genus *Homo* and the human species compared to primate species and animal species.

Culture, Cultural Diversity, and the Darwin-Wallace Pattern: Thus, culture and language are non-genetic mechanisms for increasing the qualities across individual organisms in the human species, and increasing the number and categories of differences and similarities across individuals and groups; moreover, culture and language co-evolve with human biology, and, over generations, clearly increase the number and diversity of characteristics and adaptive properties across individuals and groups in the evolution of the human species from the earliest human societies of the archaic human species approximately 500,000 years ago, to contemporary human societies that manifest a larger and greater diversity of faces and facial characteristics, body types and physical characteristics, and behavioral characteristics, including intelligences, talents, personality characteristics, emotions, and expressions (behavioral characteristics that are themselves expressed in cultural patterns, such as written and spoken languages, Arabic numerals, or forms of expertise associated with different groups or organizations).

In summary, it may be recognized that different biological forces contribute to the Darwin-Wallace pattern of constant or near constant slight variations across individual organisms in species, including genetic mutation, sexual reproduction and genetic recombination, and also gene duplication and transposable elements; in the evolution of the human species, the emergence of language and culture is a major transition of evolution: language and culture are sources of variation across individuals and groups in the human species, and increase the capacity for variation across individuals and groups in the four main ways discussed above, including increasing (slight) variations and diversity across individuals and groups; increasing the capacity for large cultural differences between the present, the future, and the past, as in large-scale or paradigmatic innovation and creativity in the sciences, the arts, philosophy, technology, religion, or other cultural patterns; increasing cultural differences and chasms of cultural differences across groups, as in separate and different spoken languages and written languages, religions and religious traditions, music, art and architecture, or separate and different science, technology, philosophy, and morality; culture also may reduce cultural differences and cultural chasms across groups, as in the diffusion and spread of gods, goddesses, and God, music, the arts, science, philosophy, technology, or spoken and written languages that replace earlier languages, or that are translated between existing languages.

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